

University of Missouri Extension

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Tables for Weights and Measurement: Crops

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These tables give weights per bushel, weights of grain by volume, moisture conversion and planting rates.

Table 1 **Weights per bushel**

- Alfalfa
60 pounds per bushel
- Barley
48 pounds per bushel
- Clover, Alsike
60 pounds per bushel
- Clover, Crimson
60 pounds per bushel
- Clover, Ladino
60 pounds per bushel
- Clover, White
60 pounds per bushel
- Clover, Red
60 pounds per bushel
- Clover Sweet
60 pounds per bushel
- Corn, shelled
56 pounds per bushel
- Corn, ear
70 pounds per bushel
- Cotton
32 pounds per bushel
- Cowpeas
60 pounds per bushel
- Flax
60 pounds per bushel
- Grass, Brome (smooth)
14 pounds per bushel
- Grass, Blue
14 pounds per bushel
- Grass, Fescue (tall)
14 pounds per bushel
- Grass, Orchard
14 pounds per bushel

- Grass, Redtop
14 pounds per bushel
- Grass, Timothy
45 pounds per bushel
- Lespedeza
40 to 50 pounds per bushel
- Millet
50 pounds per bushel
- Oats
32 pounds per bushel
- Rape
60 pounds per bushel
- Rye
56 pounds per bushel
- Sorghum, forage
50 pounds per bushel
- Sorghum, grain
56 pounds per bushel
- Soybeans
60 pounds per bushel
- Sudan grass
28 pounds per bushel
- Sunflower (oil type)
24-32 pounds per bushel
- Trefoil, Birdsfoot
60 pounds per bushel
- Vetch
60 pounds per bushel
- Wheat
60 pounds per bushel

Table 2
Calculating approximate weight of grain by volume

Standard bushel weight	Pounds per cubic feet
60 pounds	48.18
56 pounds	44.97
50 pounds	40.15
48 pounds	38.54
45 pounds	36.14
28 pounds	22.48
14 pounds	11.24
70 pounds (ear corn)	28.00 ¹

¹ Varies greatly with ear size and moisture content.

Measuring cubic feet

Width in feet multiplied by length in feet multiplied by depth of grain in feet equals cubic feet in square or rectangular enclosures.

Example

10 feet width x 14 feet length x 9 feet grain depth = 1,260 cu. feet

In circular bins, the formula is: pi (3.14) multiplied by the radius squared, multiplied by the depth of grain = cubic feet.

Obtaining total grain weight

Multiply cubic feet of volume by the appropriate figure from Table 2 under pounds per cubic feet.

If actual bushel weight (test weight) is available, multiply actual bushel weight by 0.803. This calculation will give a more accurate figure for pounds per cubic feet than you can get from the table.

Table 3

Moisture conversion for ear and shelled corn

Moisture in grain	Harvest weight of ear corn to yield 56 pounds of shelled corn at 15.5 percent moisture ¹	Shelled corn equivalent to 56 pounds of shelled corn at 15.5 percent moisture
10 percent	63.49 pounds	52.56 pounds
10.5 percent	63.86 pounds	52.87 pounds
11 percent	64.25 pounds	53.16 pounds
11.5 percent	64.65 pounds	53.46 pounds
12 percent	65.06 pounds	53.77 pounds
12.5 percent	65.60 pounds	54.08 pounds
13 percent	65.95 pounds	54.39 pounds
13.5 percent	66.42 pounds	54.70 pounds
14 percent	66.89 pounds	55.02 pounds
14.5 percent	67.39 pounds	55.34 pounds
15 percent	67.89 pounds	55.67 pounds
15.5 percent	68.40 pounds	56.00 pounds
16 percent	68.94 pounds	56.33 pounds
16.5 percent	69.51 pounds	56.67 pounds
17 percent	70.09 pounds	57.01 pounds
17.5 percent	70.69 pounds	57.35 pounds
18 percent	71.31 pounds	57.70 pounds
18.5 percent	71.95 pounds	58.06 pounds
19 percent	72.60 pounds	58.41 pounds
19.5 percent	73.27 pounds	58.78 pounds

20 percent	73.96 pounds	59.15 pounds
20.5 percent	74.60 pounds	59.52 pounds
21 percent	75.36 pounds	59.89 pounds
21.5 percent	76.07 pounds	60.28 pounds
22 percent	76.79 pounds	60.66 pounds
22.5 percent	77.53 pounds	61.05 pounds
23 percent	78.25 pounds	61.45 pounds
23.5 percent	79.01 pounds	61.85 pounds
24 percent	79.76 pounds	62.26 pounds
24.5 percent	80.50 pounds	62.67 pounds
25 percent	81.25 pounds	63.09 pounds
25.5 percent	82.03 pounds	63.51 pounds
26 percent	82.82 pounds	63.94 pounds
26.5 percent	83.50 pounds	64.38 pounds
27 percent	84.19 pounds	64.82 pounds
27.5 percent	84.90 pounds	65.26 pounds
28 percent	85.62 pounds	65.72 pounds
28.5 percent	86.32 pounds	66.18 pounds
29 percent	87.04 pounds	66.64 pounds
29.5 percent	87.76 pounds	67.12 pounds
30 percent	88.50 pounds	67.60 pounds
30.5 percent	89.22 pounds	68.08 pounds
31 percent	89.94 pounds	68.57 pounds
31.5 percent	90.67 pounds	69.08 pounds
32 percent	91.43 pounds	69.58 pounds
32.5 percent	92.13 pounds	70.10 pounds
33 percent	92.85 pounds	70.62 pounds
33.5 percent	93.55 pounds	71.15 pounds
34 percent	94.28 pounds	71.69 pounds
34.5 percent	94.98 pounds	72.24 pounds
35 percent	95.71 pounds	72.80 pounds

¹Ear corn values supplied by Dr. Marcus Zuber, MU Agronomy Department. Ear corn values apply with greatest accuracy at harvest because differences in cob and grain moisture will change in storage. Shelled corn figures apply at any time.

Obtaining bushels of grain

Divide total grain weight by appropriate standard bushel weight.

Obtaining number of hundredweights (cwts) of grain

Divide total grain weight by 100.

Table 4

Moisture conversion for soybeans

Moisture in grain	Soybeans equivalent to 60 pounds of Soybeans at 13.0 percent Moisture
10 percent	58.00 pounds
11 percent	58.65 pounds
12 percent	59.32 pounds
13 percent	60.00 pounds
14 percent	60.70 pounds
15 percent	61.41 pounds
16 percent	62.14 pounds
17 percent	62.89 pounds
18 percent	63.66 pounds
19 percent	64.64 pounds
20 percent	65.25 pounds
21 percent	66.08 pounds
22 percent	66.92 pounds
23 percent	67.79 pounds
24 percent	68.68 pounds
25 percent	69.60 pounds
26 percent	70.54 pounds
27 percent	71.51 pounds
28 percent	72.50 pounds
29 percent	73.52 pounds
30 percent	74.57 pounds

Table 5

Moisture conversion for wheat

Moisture in grain	Wheat equivalent to 60 pounds of wheat at 13.5 percent moisture
10 percent	57.67 pounds
11 percent	58.65 pounds

12 percent	59.32 pounds
13 percent	59.66 pounds
13.5 percent	60.00 pounds
14 percent	60.35 pounds
15 percent	61.06 pounds
16 percent	61.79 pounds
17 percent	62.53 pounds
18 percent	63.29 pounds
19 percent	64.07 pounds
20 percent	64.88 pounds
21 percent	65.70 pounds
22 percent	66.54 pounds
23 percent	67.40 pounds
24 percent	68.29 pounds
25 percent	69.20 pounds
26 percent	70.14 pounds
27 percent	71.10 pounds
28 percent	72.08 pounds
29 percent	73.10 pounds
30 percent	74.14 pounds

Table 6

Moisture conversion for grain sorghum

Percent moisture in grain	Grain sorghum equivalent to 56 pounds of grain sorghum at 13 percent moisture
10 percent	54.13 pounds
11 percent	54.74 pounds
12 percent	55.36 pounds
13 percent	56.00 pounds
14 percent	56.65 pounds
15 percent	57.32 pounds
16 percent	58.00 pounds
17 percent	58.70 pounds
18 percent	59.41 pounds
19 percent	60.15 pounds
20 percent	60.90 pounds

21 percent	61.67 pounds
22 percent	62.46 pounds
23 percent	63.27 pounds
24 percent	64.11 pounds
25 percent	64.96 pounds
26 percent	65.83 pounds
27 percent	66.74 pounds
28 percent	67.67 pounds
29 percent	68.62 pounds
30 percent	69.60 pounds

Calculating other conversion factors

These conversion tables cover the most widely grown crops and the most common moisture contents. When you need other conversions, the calculations are relatively simple.

Use **percent dry matter** in making conversions because the problem is to obtain the same weight of dry matter as is found in a standard bushel. For example, a standard bushel of wheat contains 60 pounds at 13.5 percent moisture. Thus, 86.5 percent dry matter $(100-13.5) \times 60$ pounds = 51.9 pounds of dry matter.

Example

How many pounds of 20.5 percent moisture wheat is equivalent to a standard bushel?

13.5 percent Standard Moisture Content = $100 - 13.5 = 86.5$ percent Dry Matter

20.5 percent Moisture Content = $100 - 20.5 = 79.5$ percent Dry Matter

$86.5 \div 79.5 = 108.8$ percent

$(108.8 \times \text{Standard Bu. Wt. (60 for Wheat)}) \div 100 = 65.28$ pounds equivalent to a standard bushel

To check your answer:

65.28×79.5 percent dry matter = 51.9 pounds of dry matter

Table 7

Common measures and approximate metric equivalents

- 1 liquid teaspoon = 5 milliliters
- 3 liquid teaspoons = 1 liquid tablespoon = 15 milliliters
- 2 liquid tablespoons = 1 liquid ounce = 30 milliliters
- 8 liquid ounces = 1 liquid cup = 0.24 liter
- 2 liquid cups = 1 liquid pint = 0.47 liter
- 2 liquid pints = 1 liquid quart = 0.9463 liter
- 4 liquid quarts = 1 liquid gallon (U.S.) = 3.7854 liter

Table 8
Conversion factors for metric and English units

Length

- 1 mile = 1.609 kilometers
- 1 kilometer = 0.621 miles
- 1 yard = 0.914 meters
- 1 meter = 1.094 yards
- 1 inch = 2.54 centimeters
- 1 centimeter = 0.394 inches

Area

- 1 square mile = 2.59 square kilometers
- 1 square kilometer = 0.386 square miles
- 1 acre = 0.00405 square kilometers
- 1 square kilometer = 247.1 acres
- 1 acre = 0.405 hectares
- 1 hectare = 2.471 acres

Volume

- 1 acre-inch = 102.8 cubic meters
- 1 cubic meter = 0.00973 acre-inches
- 1 quart = 0.946 liters
- 1 liter = 1.057 quarts
- 1 bushel = 0.352 hectoliters
- 1 hectoliter = 2.838 bushels

Weight

- 1 pound = 0.454 kilograms
- 1 kilogram = 2.205 pounds
- 1 pound = 0.00454 quintals
- 1 quintal = 220.5 pounds
- 1 ton = 0.9072 metric tons
- 1 metric ton = 1.102 tons

Yield or rate

- 1 pound per acre = 1.121 kilograms per hectare
- 1 kilogram per hectare = 0.892 pounds per acre
- 1 ton per acre = 2.242 tons per hectare
- 1 ton per hectare = 0.446 tons per acre
- 1 bushel per acre = 1.121 quintals per hectare
- 1 quintal per hectare = 0.892 bushel per acre
- 1 bushel per acre (60#) = 0.6726 quintals per hectare
- 1 quintal per hectare = 1.487 (60#) 1 bushel per acre (56#) = 0.6278 quintals per hectare
- 1 quintal per hectare = 1.597 (56#)

Temperature

- To convert Fahrenheit (F) to Celsius (C): $0.555 \times (F - 32)$
- To convert Celsius to Fahrenheit: $(1.8 \times C) + 32$

Table 9

Mixing small quantities of liquid spray. The first column represents concentration of active ingredient per gallon; the second column provides corresponding amount to mix for 1,000 square feet to get 1 pound per acre of active ingredient

Concentration of active ingredient per gallon	Amount to mix for 1000 square feet to get 1 pound per acre of active ingredient
1 pound	7 tablespoons or 103 milliliters
2 pounds	3.5 tablespoons or 51.5 milliliters
3 pounds	2.3 tablespoons or 34.3 milliliters
4 pounds	1.7 tablespoons or 25.8 milliliters

Checking planting rate or stand per acre

This table may be useful in checking actual planting rate when planting a crop. It can also be used in obtaining stand counts.

Determine average spacing in inches between seeds (or plants) in the row. Then divide the appropriate figure in the right hand column by this figure to determine planting rate (or stand).

Example

Grain sorghum planted in 30-inch rows is found to average 2.5 inches between seeds.

$209,088 \div 2.5 = 83,635$ seeds being planted per acre.

Or the grain sorghum stand averages 1 plant per 3.5 inches of row. Then $209,088 \div 3.5 = 59,379$ plants per acre.

You can use this method without the table as long as you remember that there are 43,560 square feet per acre and that 144 square inches = 1 square foot.

$43,560 \times 144 = 6,272,630$ square inches per acre.

Divide 6,272,640 by inches of row width to obtain inches of row per acre ($6,272,640 \div 30 = 209,088$).

Row spacing	Inches of row per acre
40 inches	155,682
38 inches	165,069
36 inches	174,240
30 inches	209,088
28 inches	224,023
24 inches	261,360
20 inches	313,632
18 inches	348,480

15 inches	418,176
14 inches	448,046
12 inches	522,720
10 inches	627,264
8 inches	784,080
7 inches	896,091

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